TESTS ON THE COLOR FASTNESS TO LIGHT OF DYED TEXTILES

E. R. Pierce

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When an engineer wants to measure the strength of a steel column it is a comparatively simple matter to put the column in a press and measure the load it will carry in pounds per square inch. When the weight of some object is desired it is easy to weigh the object and obtain an answer in pounds. Volumes, specific gravities, and densities may be determined in the same way. All of these physical properties are clearly defined and measurable. Consider, on the other hand, the fading properties of dyed cloth. There is no means by which the amount a specimen of cloth has faded can be measured. To overcome this difficulty the Research Committee of the American Association of Textile Chemists and Colorists began a few years ago to set up a series of standards, a series of cloths whose fastness to light was known and to which other samples of cloth could be compared. For example, if a certain sample is to be tested it is exposed to strong light for a given period of time, and then compared with a standard of similar quality which had been exposed for the same period of time. If the new sample has faded more than the standard, it fails the test; if it has faded less than the standard it passes the test. If a cloth is to be classified according to its fastness to light, it will be exposed for a given length of time and then compared with several different grades of cloth, each exposed for the same length of time under the same conditions. Suppose the sample faded more than grade 5, but less than grade 4; that sample would be classified as between 4 and

5 on the standard color fastness-to-light scale.

In order to institute such a system, suitable standards had to be chosen and different length tests made on them. This was done at the National Bureau of Standards, where I was employed by the American Association of Textile Chemists and Colorists during the summer of 1940. Eight samples of cloth of different fastness to light were chosen, each to be put through tests varying in length from 1 hour to 768 hours. Sample No. 1 showed distinct signs of fading after two hours, and was nearly white after forty eight hours, while sample No. 8 didn't begin to show any signs of fading until after 192 hours and had faded very slightly at the end of the test.

Similar tests were run using natural sunlight and artificial light from a Fadeometer. Samples exposed to sunlight were displayed on the roof of the Bureau, on dry, bright days only, between the hours of 9 and 3 o'clock. In exposing the samples half of the cloth was covered up in order that the faded cloth could easily be compared with its original color. 768 hour tests run at the rate of 6 hours a day, on bright days only, of course took a great length of time. To overcome this difficulty a machine called a Fadeometer was used. It consisted merely of a carbon arc lamp around which samples could be hung in small metal frames a constant distance, about 14 inches, from the arc. The humidity inside the machine was kept constantly high. Cloth fades much faster in wet atmosphere. This machine would run 20 hours on one set of electrodes,

and by running it all night tests were much faster than by the natural sunlight method.

At the end of the summer both tests had been completed and the samples mounted and filed in the proper order. The war has of course slowed down such research, but one of the most interesting and untouched experimental fields lies in the development of tests for color fastness to light of dyed textiles.